Electronic Version

Stylesheet Version v1.1.1

USB Smart Switch with Packet Re-Ordering for Interleaving among Multiple Flash-Memory Endpoints Aggregated as a Single Virtual USB Endpoint

Abstract

A dual-mode Universal-Serial-Bus (USB) switch can operate in a normal hub mode to buffer transactions from a host to multiple USB flash storage blocks that are USB endpoints. When operating in a single-endpoint mode, the dual-mode USB switch intercepts packets from the host and responds to the host as a single USB endpoint. The USB switch aggregates all downstream USB flash storage blocks and reports a single pool of memory to the host as a single virtual USB memory. Adjacent transactions can be overlapped by packet re-ordering. A token packet that starts a following transaction is re-ordered to be sent to the USB flash storage blocks before the data and handshake packets that end a first transaction, allowing the second transaction to begin accessing the flash memory earlier. Data can be mirrored or striped across several USB flash storage blocks and parity can be added for error

recovery.